

Client's ref.: 91P78
Our ref.: 0702-9559US/final/M.F.Lin

What is claimed is:

- 1 1. A metric generator comprising:
 - 2 a bit-distance calculator receiving a complex signal
 - 3 along with a constellation that is divided into a
 - 4 one group and a zero group for each bit location,
 - 5 in which the complex signal is modulated using
 - 6 the constellation, for calculating a first
 - 7 distance of the zero group and a second distance
 - 8 of the one group for each received bit,
 - 9 comprising:
 - 10 means for shifting the complex signal by a
 - 11 predetermined value depending on the
 - 12 constellation and extracting an integer part
 - 13 of the shifted complex signal;
 - 14 means for finding a first position and a second
 - 15 position respectively located in the zero
 - 16 and the one groups for each bit from a
 - 17 lookup table for the constellation, wherein
 - 18 the first position is nearest to the integer
 - 19 part of the shifted complex signal within
 - 20 the zero group of the constellation and the
 - 21 second position is nearest to the integer
 - 22 part of the shifted complex signal within
 - 23 the one group of the constellation;
 - 24 means for inversely shifting the first and the
 - 25 second positions by the predetermined value
 - 26 respectively; and
 - 27 means for respectively calculating the first
 - 28 distance of the zero group between the

Client's ref.: 91P78

Our ref.: 0702-9559US/final/M.F.Lin

29 complex signal and the inversely shifted
30 first position as well as the second
31 distance of the one group between the
32 complex signal and the inversely shifted
33 second position;

34 means for multiplying the first distance of the zero
35 group by a weighting factor associated with the
36 complex signal to yield a bit metric of zero for
37 each received bit; and

38 means for multiplying the second distance of the one
39 group by the weighting factor associated with the
40 complex signal to yield a bit metric of one for
41 each received bit.

1 2. The metric generator of claim 1 wherein the bit-
2 distance calculator is fed with a real part of the complex
3 signal when an even-numbered bit is to be processed.

1 3. The metric generator of claim 1 wherein the bit-
2 distance calculator is fed with an imaginary part of the
3 complex signal when an odd-numbered bit is to be processed.

1 4. The metric generator of claim 1 wherein the complex
2 signal is compliant with a standard of Digital Video
3 Broadcasting - Terrestrial (DVB-T).

1 5. The metric generator of claim 4 wherein the
2 constellation is representative of QPSK, 16-QAM, 64-QAM,
3 non-uniform 16-QAM or non-uniform 64-QAM mapping.

Client's ref.: 91P78
Our ref.: 0702-9559US/final/M.F.Lin

1 6. The metric generator of claim 5 wherein the
2 predetermined value is a parameter α dictated by the DVB-T
3 standard for the constellation.

1 7. The metric generator of claim 5 wherein the
2 constellation is divided into the one and the zero groups
3 depending on a bit value of 1 or 0 at each bit location.

1 8. The metric generator of claim 1 wherein the
2 weighting factor is a channel-state information value.

1 9. An OFDM receiver comprising:

2 a de-interleaver for de-interleaving a series of
3 symbol-based data inverse to interleaving
4 operations at a transmitter end, in which the
5 symbol-based data is modulated with a
6 constellation;

7 a dynamic quantizer coupled to the de-interleaver, for
8 compressing the de-interleaved symbol-based data
9 to yield a complex signal in accordance with a
10 scheme of the constellation; and

11 a metric generator coupled to the dynamic quantizer to
12 receive the complex signal, for partitioning the
13 constellation into a one group and a zero group
14 for each bit location, generating a bit metric of
15 zero with respect to the zero group of the
16 constellation for each received bit, and
17 generating a bit metric of one with respect to
18 the one group of the constellation for each
19 received bit.

Client's ref.: 91P78

Our ref.: 0702-9559US/final/M.F.Lin

1 10. The OFDM receiver of claim 9 wherein the de-
2 interleaver provides a real part of the de-interleaved
3 symbol-based data when an even-numbered bit is to be
4 processed.

1 11. The OFDM receiver of claim 9 wherein the de-
2 interleaver provides an imaginary part of the de-interleaved
3 symbol-based data when an odd-numbered bit is to be
4 processed.

1 12. The OFDM receiver of claim 10 wherein the metric
2 generator computes the bit metric of zero and the bit metric
3 of one for the even-numbered bit from a real part of the
4 complex signal and a channel-state information value
5 associated with the complex signal.

1 13. The OFDM receiver of claim 11 wherein the metric
2 generator computes the bit metric of zero and the bit metric
3 of one for the odd-numbered bit from an imaginary part of
4 the complex signal and a channel-state information value
5 associated with the complex signal.

1 14. The OFDM receiver of claim 9 wherein the series of
2 symbol-based data is compliant with a standard of Digital
3 Video Broadcasting - Terrestrial (DVB-T) and the de-
4 interleaver is an inner de-interleaver comprising symbol and
5 bit de-interleavers compliant with the DVB-T standard.

1 15. The OFDM receiver of claim 9 wherein the
2 constellation is divided into the one and the zero groups
3 depending on a bit value of 1 or 0 at each bit location.

Client's ref.: 91P78
Our ref.: 0702-9559US/final/M.F.Lin

1 16. An OFDM receiver comprising:
2 a first dynamic quantizer for compressing a series of
3 channel-state information values;
4 a bit de-interleaver for de-interleaving a series of
5 symbol-based data inverse to interleaving
6 operations at a transmitter end and providing the
7 compressed channel-state information value
8 associated with the de-interleaved symbol-based
9 data, in which the symbol-based data is modulated
10 with a constellation;
11 a second dynamic quantizer coupled to the bit de-
12 interleaver, for compressing the de-interleaved
13 symbol-based data to yield a complex signal in
14 accordance with a scheme of the constellation;
15 and
16 a metric generator respectively coupled to the second
17 dynamic quantizer and the bit de-interleaver to
18 receive the complex signal and the compressed
19 channel-state information value associated with
20 the complex signal, for partitioning the
21 constellation into a one group and a zero group
22 for each bit location, and generating bit metrics
23 of zero and one with respect to the zero and the
24 one groups of the constellation for each received
25 bit, separately;
26 wherein the bit metric of zero and the bit metric of
27 one for an even-numbered bit are computed from a
28 real part of the complex signal and the

Client's ref.: 91P78
Our ref.: 0702-9559US/final/M.F.Lin

29 compressed channel-state information value
30 associated with the complex signal;
31 wherein the bit metric of zero and the bit metric of
32 one for an odd-numbered bit are computed from an
33 imaginary part of the complex signal and the
34 compressed channel-state information value
35 associated with the complex signal.

1 17. The OFDM receiver of claim 16 wherein the bit de-
2 interleaver provides a real part of the de-interleaved
3 symbol-based data when the even-numbered bit is to be
4 processed.

1 18. The OFDM receiver of claim 16 wherein the bit de-
2 interleaver provides an imaginary part of the de-interleaved
3 symbol-based data when the odd-numbered bit is to be
4 processed.

1 19. The OFDM receiver of claim 16 wherein the series of
2 symbol-based data is compliant with a standard of Digital
3 Video Broadcasting - Terrestrial (DVB-T) and the de-
4 interleaver is an inner de-interleaver comprising symbol and
5 bit de-interleavers compliant with the DVB-T standard.

1 20. The OFDM receiver of claim 16 wherein the
2 constellation is divided into the one and the zero groups
3 depending on a bit value of 1 or 0 at each bit location.